

**WHAT IS CLAIMED IS:**

1. An optical module comprising:

a stem;

5 a silicon optical bench disposed on the stem, the silicon optical bench having a V-groove;

a laser diode disposed in the V-groove;

a photo diode disposed in the stem, the photo diode converts light received from the laser diode into current; and

10 a plurality of leads coupled to the stem.

2. The optical module as claimed in claim 1, further comprising an inductor as a choke disposed on the silicon optical bench and connected to the laser diode.

15 3. The optical module as claimed in claim 2, wherein the inductor is a spiral type thin-film inductor.

4. The optical module as claimed in claim 1, further comprising a RF matching resistor disposed on the silicon optical bench and electrically connected with the laser diode.

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5. The optical module as claimed in claim 1, wherein the photo diode is bonded to the silicon optical bench.

6. The optical module as claimed in claim 1, wherein the plurality of leads is bonded to the silicon optical bench using an epoxy or solder.

7. The optical module as claimed in claim 1, wherein the stem and the leads are  
5 bonded using glass seal powders having lower dielectric constants than those of ceramic materials.

8. The optical module as claimed in claim 7, wherein the glass seal powder is selected from the group consisting of a hard glass that belongs to the  $B_2O_3$ - $SiO_2$  series and  
10 a soft glass that belongs to the  $Na_2O$ - $BaO$  series.

9. The optical module as claimed in claim 1, wherein the plurality of leads comprises:

the first lead electrically connected with an anode of the laser diode;

15 the second and the third lead electrically connected with a DC terminal and a RF terminal of the laser diode respectively; and

the fourth and the fifth lead electrically connected with an anode and a cathode of the photo diode, respectively.

20 10. The optical module as claimed in claim 9, wherein the first lead and the fifth lead are common.

11. The optical module as claimed in claim 9, further comprising an inductor connected between the cathode of the photo diode and the anode of the laser diode in order to achieve RF isolation.

5           12. An optical module comprising:

a stem;

a silicon optical bench disposed in the stem, the silicon optical bench having a V-groove;

a laser diode disposed in the V-groove;

10           a photo diode disposed in the stem, the photo diode converts light received from the laser diode into current; and

a plurality of ceramic feed-throughs coupled to the stem.